

10 YEARS AFTER

# THE FIRES OF 1988

The power of nature fascinates us. We are amazed—and often frightened—by the intensity of an earthquake, the strength of the wind, the force of rushing water, and the quiet pressure of snow.

Nature is not static, and the world around us is always changing. Sometimes the changes are gradual, like the creation of a canyon by the constant flow of water over soft rock or the slow buildup of minerals into the formations we see today in Yellowstone's thermal basins. Other times the changes are dramatic, like the sudden eruption of a volcano or the raging blaze of a wildfire.

From the earliest time, humans have used and tried to control fire. Where we have placed our homes and agricultural developments, fire is suppressed. But in the natural world, fire is an integral part of life. In a forest ecosystem, for example, trees sprout and grow for tens or hundreds of years, then become infected with disease, die, and fall to the ground. Fire is nature's way of cleaning up the dead so that the living can get on with things. However, this important role of fire in the health of an ecosystem has not long been understood, and where humans have placed a value on a natural resource or a natural landscape, many of us still do not welcome fire.

The greater Yellowstone area fires of 1988 received more national attention than any other event in the history of national parks. Reactions to the fires ranged from anger to awe, sadness to fascination, a sense of loss to a sense of beginning. In the ten years that have passed since 1988, much has been learned about the impacts and benefits of fire, and the blackened hillsides in Yellowstone have turned green with the growth of new, young trees.

## THE STAGE IS SET

Naturally caused fires have occurred in the Yellowstone area for as long as there has been vegetation to burn. While fires occur every year in this region, the last fires as large as those of 1988 occurred during the early 1700s. The fires of 1988 were the end of a cycle that began nearly 300 years earlier.

The dominant tree in the Yellowstone area is lodgepole pine, which looks like a tall, skinny telephone pole with a Christmas tree on top. Forests of lodgepole pine tend to be uniform in age and extensive in size as a result of fire. This is because the lodgepole pine is able to grow in thin soils and harsh environments (like those of the Yellowstone region) and, therefore, outcompetes other tree species after a fire. It takes 250 to 300 years for a lodgepole pine forest to mature and reach the stage where it is most vulnerable to fire.

As the 1988 fire season began, there was no indication that it would be unusual. Precipitation had been above normal at Mammoth Hot Springs for the months of April and May. Consequently, fires that had been ignited by lightning in late May and early June were allowed to burn "within prescription." (Just as prescription drugs are used under special, approved conditions, prescribed fires are allowed to burn under certain conditions.)

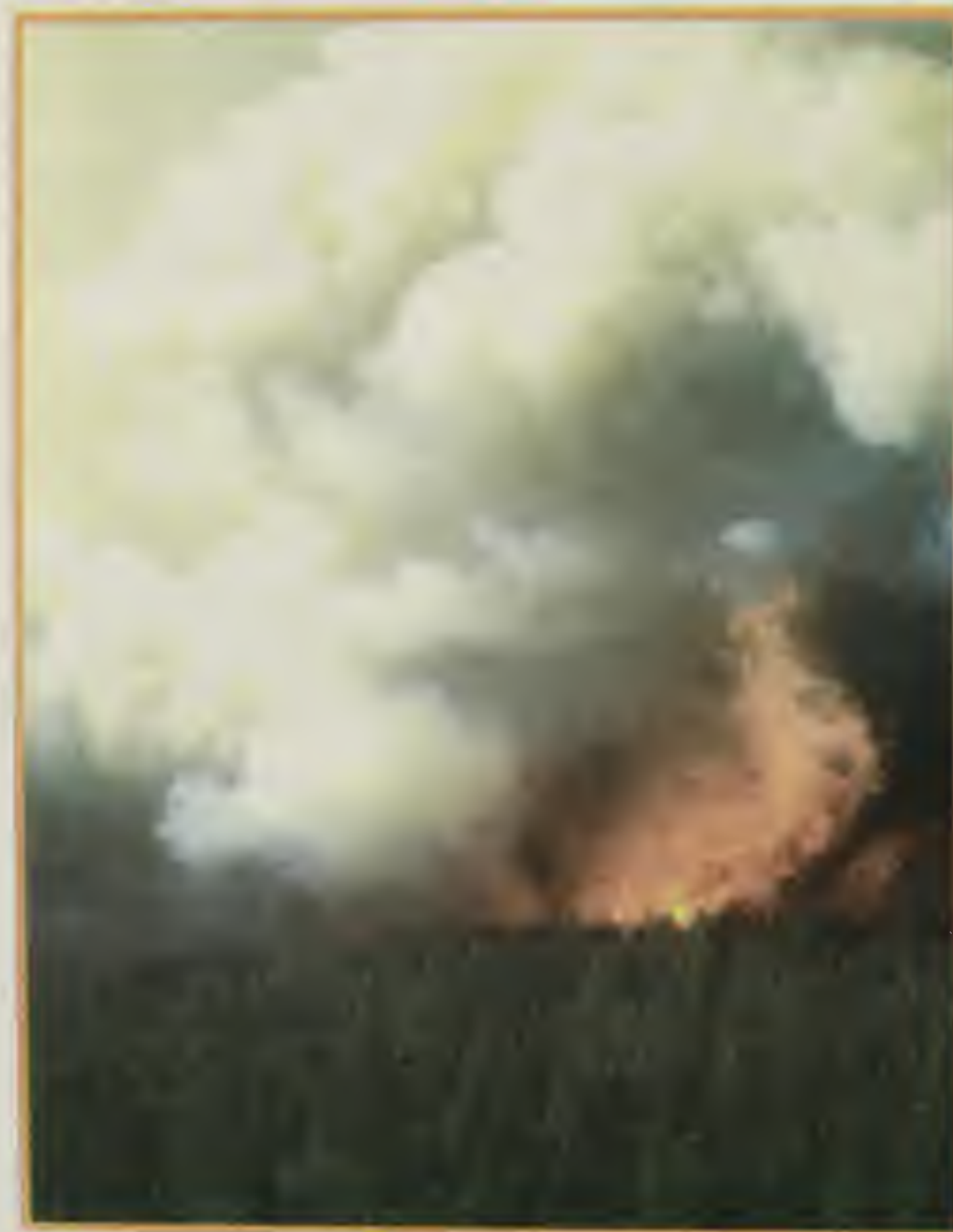
However, by mid-June, weather patterns and precipitation conditions had changed. Yellowstone National Park entered what would become the driest summer on record. Practically no rain fell in June, July, or August, an unprecedented situation in the park's 112-year written record of weather statistics. Average daily temperatures were above normal, and humidity levels (normally between 15 and 30%) dipped below 10%. Vegetation dried out. The moisture content of grasses and low-growing shrubs was measured at 2-3% and that of trees at 7%. By comparison, kiln-dried lumber has a moisture content of 12%. While the normal summer thunderstorms of July and August contained little or no moisture, they had twice the expected number of lightning strikes. These storms were commonly accompanied by winds of 20 to 40 miles per hour, with gusts up to 70 miles per hour. With the combination of extensive stands of old-growth forest, a severe drought, dry and windy storms, and low fuel moisture, the stage was set for the fire season of 1988.



## HIGH DRAADS

During the summer of 1988, there were 249 individual fires in the greater Yellowstone area. Fifty of these fires either started in Yellowstone National Park or burned into the park. Lightning caused 41 of the fires in the park; humans caused the remaining 9.

The first fire of the season in Yellowstone was started by lightning on May 24 and went out the same day after burning less than one acre. Under prescribed fire conditions in place at that time, naturally caused fires were simply monitored as long as they did not threaten human life or property. But, by mid-July, with the changes in precipitation and weather conditions, the decision was made that all fires, no matter how they started, would be aggressively fought as soon as they were detected.



The largest fire that summer began on July 22 when a woodcutter tossed a cigarette to the ground in the Targhee National Forest, just a few hundred yards west of Yellowstone National Park. This thoughtless act ignited the North Fork fire. The fire was detected within an hour, and firefighters immediately and vigorously fought it. However, the North Fork fire would eventually burn 406,359 acres and threaten the town of West Yellowstone and the park developments of Old Faithful, Madison, Canyon, Tower, and Mammoth Hot Springs. Despite the efforts of firefighters, the North Fork fire was not contained until the snows of September began to fall.

Unprecedented fire behavior was a hallmark of the 1988 fires. At times, fires advanced at a rate of two miles per hour through the forests. The

Storm Creek fire, pushed by 70 to 80 mile per hour winds, advanced 10 miles in three hours. Flames often reached 100 to 200 feet above the tops of the trees and carried hot embers ahead of fires, creating "spot" fires. In this way, fires jumped what had been considered effective barriers, such as the Grand Canyon of the Yellowstone, the Madison River, and two-lane highways. Many times the fires created their own weather (in particular, winds), and they regularly put up convection columns of heat and smoke with cumulus-cloud caps. On August 20, "Black Saturday," more square miles burned in a single 24-hour period than had burned during any decade since the park was established in 1872.

More than 25,000 firefighters were present in the greater Yellowstone area during the course of the summer, including Army, Navy, Air Force, Marine,

"IN YELLOWSTONE, THE RESOURCE IS NOT 20,000 ELK OR A MILLION LODGEPOLE PINES OR A SINGLE GRIZZLY BEAR. THE RESOURCE IS WILDNESS. THE INTERPLAY OF ALL THE PARTS OF THE WILDERNLSS—WEATHER, ANIMALS, PLANTS, EARTHQUAKES—ACTING UPON EACH OTHER TO CREATE THE WILD. SETTING CREATES A STATE OF EXISTENCE, A WILDNESS. THAT IS THE PRODUCT AND THE RESOURCES FOR WHICH YELLOWSTONE IS BEING PRESERVED."

*Don DePaola - Former 60<sup>th</sup> Plant Ecologist*

and National Guard personnel. Firefighters dug 665 miles of firelines, constructed 137 miles of bulldozer lines, covered threatened buildings with tons of wetting and foaming agents, and dropped 1.4 million gallons of retardant and 10 million gallons of water on the fires. But, the fires continued to burn until the first snow fell on September 11. While unable to stop the advancing fires, firefighting efforts were successful in preventing deaths and saving structures in the park and the surrounding communities, including the beloved and historic Old Faithful Inn.

## AFTERMATH

After the fires were controlled and contained, work immediately began to assess the effects of the flames and to repair the damage done by the firefighting efforts. Where standing dead trees were determined to be a safety problem, they were cut down. Firelines created by hand tools and bulldozers were identified, mapped, and restored to natural conditions. Otherwise, nature was left alone in Yellowstone National Park to restore itself at its own pace.

While no visitors or residents of the area died, two firefighters lost their lives in fire-related activities outside of Yellowstone National Park. The lives of area residents were severely disrupted for months, and, although the park remained open during the fires, many visitors were inconvenienced. Within

Although the fires were extensive, less than 1/10 of 1% of the affected area was burned at temperatures hot enough to sterilize the soil. The underground roots, bulbs, rhizomes, and seeds of plants survived in the now nutrient-rich soils, and, with the moisture provided by winter snows and spring rains, burst forth the following spring to carpet the blackened forests with shades of green and all the colors of the rainbow.

Many people were concerned about the effects that the fires had on wildlife. More than 30,000 large animals (including bison, elk, moose, deer, and bear) live in Yellowstone in the summer. In general, these animals reacted calmly to the situation and were often observed near fires and within recently burned areas. Small mammals were probably most affected by the fires. While some may have been able escape a fire's advance by using burrows, it is likely that many died of suffocation as fire swept an area. And, after the flames passed through an area, the lack of cover made the surviving small mammals easy prey for predators.

The severe drought of 1988 probably had a greater impact on large mammals than did the fires. Grasses were less productive and had dried by September, affecting the amount and quality of forage available to ungulates. The combination of the drought and fire resulted in a large die off of hooved mammals during the severe winter of 1988-89. But these carcasses provided much needed food for bears, coyotes, foxes, eagles, magpies, and other animals.

In the first year after the fires, wildlife generally enjoyed several benefits of the postfire environment. Both grazers (such as elk, bison, rodents, and ground squirrels) and browsers (such as deer and moose) benefited from the new habitats and succulent vegetative growth. As these populations flourished, so did predators and scavengers. Cavity-nesting birds took advantage of the standing dead trees, and many other birds thrived on the increase in insects found in decaying trees.

Many species of plants and trees are dependent to some extent on fire for regeneration. Lodgepole pine, for example, produces two kinds of cones. One, called a serotinous cone, releases its seeds after being exposed to high temperatures such as those associated with fire. In the fall of 1988, it was estimated that there were as many as one million seeds per acre on the ground in some burned areas!

While the fires may have ended one chapter of this forest's life story, it opened the next chapter. As the first lodgepole pine seedlings became established in burned areas, the forest was on its journey toward the next major fire occurrence in its cycle of life.



11/4/88



7/26/89



8/30/91



10/2/92





## 10 YEARS AFTER THE FIRES...

Although the fires drastically changed the visual landscape in Yellowstone National Park, they played an important role in plant succession. Ten years after the fires, lodgepole pine seedlings and saplings are well established, and the first seedlings of Engelmann spruce, subalpine fir, and Douglas-fir have begun to emerge. In these open forests, grasses, wildflowers, and shrubs have flourished because of the increased sunlight and a short-term influx of nutrients. While many of the standing dead trees still remain upright, it is anticipated that most will have fallen by 2008. In subsequent years, this downfall will continue to enrich the soil as fungi, bacteria, mites, beetles, ants, and numerous other organisms break it down.

The fires presented many research opportunities. Scientists were able to collect data before, during, and after the fires passed through an area. Studies were conducted on soil erosion rates; fire history; the reactions of various plant, bird, mammal, and insect populations to the fires as well as the economic effects of the fires on neighboring communities and visitor attitudes.

The fire management policy that was in place in 1988 directed the park to put out any fires that threatened human life or property or were started by humans. Naturally caused fires were allowed to burn as an integral part of the ecological processes that are at work in Yellowstone. After the fires, this policy underwent extensive review by a panel of fire experts and government officials. While reaffirming the positive role of fire in the ecosystem, the panel recommended that additional fire management guidelines be followed. These included daily certifications that fires were within controllable parameters and that adequate suppression resources were available to ensure that fires would remain "in prescription" for the next 24 hours.

The Yellowstone fires of 1988 were an important event in the natural history of the area. There are those who feel that the Yellowstone they knew and loved is gone forever. But Yellowstone is not a museum; it is a living, functioning ecosystem. Though we treasure our memories and our first impressions of such an awesome place as this, we cannot realistically expect such places to remain unchanged. Perhaps this is the true magic of Yellowstone. Through change comes awareness, through awareness comes knowledge, and with knowledge comes understanding. Yellowstone offers each of us a unique experience that is all our own—the first time and every time that we visit.

*This special supplement was produced by the National Park Service and funded through the generous support of the Yellowstone Association.*



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## 1988 FIRE FACTS

- About 793,880 acres, 36% of the park, burned within Yellowstone National Park.
- Of the 249 different fires in the greater Yellowstone area, firefighters kept 201 (81%) from growing larger than 10 acres.
- Many fires burned together, forming huge fire complexes that covered miles of steep, rugged backcountry.
- Forest fires can burn at temperatures of more than 1,200 degrees Fahrenheit.
- The Mink fire (in southeastern Yellowstone) released enough energy to heat 4,400 homes for one year.
- The last fire in the greater Yellowstone area was declared out on November 18.
- On-the-ground surveys following the fires found 269 elk, 4 deer, 2 moose, 9 bison, and 6 black bears that died as a result of the fires.
- Fire suppression efforts in the greater Yellowstone area cost about \$120 million.

